"Wood, Thomas"
<TRWOOD@stoel.com>

08/24/2006 02:49 PM

To Laura Yannayon/R9/USEPA/US@EPA

cc Amy Zimpfer/R9/USEPA/US@EPA, gyee@arb.ca.gov, oceanair1@worldnet.att.net, Rick.Abel@bhpbilliton.com, Margaret Alkon/R9/USEPA/US@EPA

bcc

Subject RE: EPA's review of the proposed marine repowering projects

History: This message has been forwarded.

Laura: We got your comments and are reviewing them. As you noted, BHP is proceeding with source testing the Klihyam. We had hoped this test would be completed already, but there have been delays getting the necessary fuel meter into the vessel prior to testing given the tug's heavy use schedule. It is now anticipated that the vessel will be tested next week. We submitted a protocol to CARB on August 9th for that testing (copy attached). Consistent with your suggestion, BHP is using the protocol referenced in South Coast Rule 1631. Duty cycle information is included in the attached document. Testing is expected to be performed by Horizon Air Measurement Services, a CARB approved company with experience testing vessels.

BHP also intends to follow your suggestion and source test the Pacific Falcon. We talked this over with CARB a few minutes ago and, without putting words in their mouth, they seem to be amenable to use of those data for baseline purposes. The Falcon is starting the line haul service pulling the Jovalan and so scheduling is difficult. However, we hope to divert the tug at the earliest opportunity for testing. With luck, that testing should be performed in the next two weeks.

Please let me know if you have any questions or comments as we proceed towards testing. We will respond to your suggestions in a more comprehensive fashion shortly, but I wanted to bring you up to date on the source test plans.

Tom

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-----Original Message-----
From: Yannayon.Laura@epamail.epa.gov
[mailto:Yannayon.Laura@epamail.epa.gov]
Sent: Tuesday, August 22, 2006 1:09 PM
To: Wood, Thomas; Rick.Abel@bhpbilliton.com
Cc: Zimpfer.Amy@epamail.epa.gov
Subject: EPA's review of the proposed marine repowering projects

Tom,

Please find attached a copy of EPA's review of BHP's proposed marine repowering projects. The originals of these documents are being sent by US mail.

If you have any questions regarding EPA's review, please feel free to

call me.

(See attached file: BHP Mitigation Summary.pdf)(See attached file: BHP Mitigation Cover.pdf)

Laura Yannayon

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TEST PROTOCOL--Klihyam.pdf

TEST PROTOCOL

Goal: Establish baseline emission factor for NOx

Test Vessel: M/V Klihyam

Operator: Sause Brothers Ocean Towing Company

Engines: EMD 16-645, 1950 h.p. each @ 900 rpm

# of Engines: Two with individual stacks (Port and Starboard)

Engine Controlled by: Manually from the Wheel House

Cooling System: Keel Cooled

Aspiration: Roots Blown

Pollutant Tested: NOx and O2

Test Protocol: As specified in SCAQMD Rule 1631(f)(3)(B); i.e., using the CARB approved in-situ source testing referenced in Diesel Marine Vessel Emissions Testing Protocol; Santa Barbara County APCD, July 1999.

Test Cycle:

Marine vessels are tested along E-3 test cycle as directed by the Santa Barbara Diesel Marine Vessel Emissions Testing Protocol and ISO 8178. E-3 test cycle consists of four speed-load points along the propeller curve.

	Mode 1	Mode 2	Mode 3	Mode 4
Load %	100	75	50	25
RPM %	100	91	80	63
Weighting factor	0.2	0.5	0.15	0.15

Test Procedure:

Each engine will be tested individually for NOx and O2. 100% of the rpm will correspond to full rpm achieved at wide open throttle using manual controls. Vessel will be taken in open seas or pushed against a dock. Readings of NOx will be taken at each load point for ten minutes. After completion of test on one engine, the test for second engine will be done. Pre and post calibration and span checks will be in accordance with standard test procedures. RPM will be read from engine rpm meter in the wheel house.

Data Reduction

- NOx read by the instruments as ppmvd will be multiplied by the exhaust flow rate. Fuel flow rate to the engine will be derived from manufacturer supplied curves for this engine. Data will then be reduced to gms/bhp-hr as cycle weighted emission factor.
- Report will contain raw data and final results

SAMPLE

ENGINE EXHAUST EMISSIONS TEST
M/V Klihyam
Baseline

SAMPLE ONLY

Baseline Test					
Port ENGINE					
Purpose of Test:		Baseline testing of 16-645 engine			
Test Date:	4/24/2006	Test Number:	1	Engine Tech:	
		Test Cycle:	E-3	Emissions Tech:	
Fuel Type:	D2	Marine			
				Project	
Engine Type:		EMD16-645E6		Leader:	
			M/V		
Aspiration:	Roots	Vessel	Klihyam		
Engine Rating:		H.P.	1500	@ RPM	900
		Pier D, Long Beach,			
Location:		CA			
File Name					

A. ENGINE PERFORMANCE DATA	**Mode 1**	**Mode 2**	**Mode 3**	**Mode 4**
Engine Power (prophp)				
Engine power (kw)				
Fuel Flow (kg/hr)				
Intake Air (dry kg/hr)				
Exhaust flow (dry kg/hr)				
Engine RPM				
Engine RPM % of Rated				
Engine Load % of Rated				
BSFC (lbs fuel/bhp-hr)				
Fuel Consumption (gal//hr)				
B. GASEOUS EMISSIONS				
NOx (dry ppmv)				
O2 (%)				

C. EXHAUST EMISSIONS ANALYSIS

Mode Weighting Factors				
Weighted Specific NOx (gms/kw-hr)				

D. RESULTS

Total Mode Weighted NOx	**gms/kw-hr**	**gms/bhp-hr**